

ENVIRONMENTAL ASSESSMENT

Cooperative Gypsy Moth Project For Indiana 2003

by

**Indiana Department of Natural Resources
Division of Entomology & Plant Pathology**

**Indiana Department of Natural Resources
Division of Forestry**

**United States Department of Agriculture
Forest Service**

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Proposed Action

The Indiana Department of Natural Resources (IDNR), Division of Entomology & Plant Pathology and Division of Forestry, proposes a cooperative project with the United States Department of Agriculture (USDA), Forest Service (USFS) to treat the gypsy moth populations at 16 sites in nine counties (see maps in Appendix B). Gypsy moth populations proposed for treatment cover an estimated 17,591 acres (Table 1). The preferred alternative for this project is Alternative 5: Btk, mating disruption and/or mass trapping.

Table 1. Proposed Treatment Sites for 2003.

COUNTY	PROPOSED SITES	TREATMENT ACRES by Treatment Method			
		Btk (aerial)	Btk (ground)	Mating disruption	Mass trapping
Allen	Northwest Allen			1850	
Kosciusko	Pierceton	57			
Lake	Brookwood	147			
LaPorte	SR4 & CR 200E	17			
	Oakwood			1932	
Marshall	Bremen			26	
	Juniper Rd	8			
Noble	Chain of Lake SP			961	
Porter	Dunes SP			1810	
	Porter			2819	
	Furnessville			1161	
	Furnessville Core	139			
	Furnessville South			383	
St. Joseph	South Bend			5959	
	South Bend Core	266			
	Shively Rd.	8			
Whitley	Churubusco	45			
	US 33	3			
Totals by Treatment		690	0	16901	0
Total of All Treatments		17591			

1.2 Project Objective

The objective for this cooperative project is to slow the spread of the gypsy moth populations by eliminating reproducing populations from the proposed treatment sites.

1.3 Need for Action

Gypsy moth is not native to the United States, and it lacks effective natural controls. The caterpillars feed on the foliage of many host plants. Oaks are the preferred host species, but the caterpillars defoliate many species of trees and shrubs when oaks are not available. As the caterpillars grow older, their host preference may change to include evergreens. Also, high numbers of gypsy moth caterpillars can cause a substantial public nuisance, affect human health, reduce tree growth, and result in branch dieback or even tree mortality.

The State of Indiana, with the IDNR, Division of Entomology and Plant Pathology as the lead agency, is dedicated to preserving urban and rural forested habitats from damage by gypsy moth and to enforcing interstate and intrastate quarantines to further protect areas not currently infested by this pest.

If no action is taken, gypsy moth will increase and spread, and defoliation will occur sooner. Therefore, the "no action" alternative is not preferred due to state officials desire to eliminate the isolated infestations, prevent human discomfort associated with infestations, delay damage to local plant communities and reduce spread to adjacent uninfested areas. Local citizens agreed that the "no action" alternative is not preferred through the scoping process (Appendix A).

1.4 Decisions to be Made and Responsible Officials

The preferred alternative in this document proposes cooperative participation of the USFS and the IDNR in treating gypsy moth populations in Indiana. The decision to be made by the responsible USFS officials is to choose which of the alternatives presented in this document best fulfills the objectives of the proposed action, and thus the needs of the people of Indiana. In addition, the decision will have to be made as to whether or not any perceived significant environmental impacts could result from the implementation of this project. If there are none, this will be documented in a Decision Notice and FONSI (Finding of No Significant Impact). If significant environmental impacts are found and the project is to continue, an Environmental Impact Statement (EIS) would be prepared.

The alternatives analyzed for this environmental assessment are: 1) No cooperative project (No action), 2) Btk, 3) Mating disruption, 4) Mass trapping, 5) Btk, mating disruption and mass trapping (Preferred Alternative). The responsible USFS official who will make this decision is:

Michael Prouty, Field Representative, USDA, Forest Service, Northeastern Area, 1992 Folwell Avenue, St. Paul, MN 55108, (651)-649-5276.

The responsible officials for the implementation of the cooperative project in the Indiana IDNR are:

Robert D. Waltz, Ph. D., State Entomologist, Indiana Department of Natural Resources, Division of Entomology and Plant Pathology, 402 West Washington Street, IGC South, Room W290, Indianapolis, IN 46204, (317) 232-4120

Burnell C. Fischer, State Forester, Indiana Department of Natural Resources, Division of Forestry, 402 West Washington Street, IGC South, Room W296, Indianapolis, IN 46204, (317) 232-4105.

1.5 Scope of the Analysis

A final environmental impact statement (FEIS), developed by the USDA, Animal & Plant Health Inspection Service (APHIS) and USFS, entitled Gypsy Moth Management in the United States: a cooperative approach (USDA 1995) was made available in November 1995. The Record of Decision for the FEIS was signed in January of 1996 (USDA 1996), and Alternative 6 was selected, which includes all three management strategies analyzed – suppression, eradication, and slow-the-spread. These strategies depend upon the infestation status of the area: generally infested, uninfested, and transition. Implementation of the FEIS preferred alternative requires that a site-specific environmental analysis be conducted to address local issues before federal or cooperative projects are conducted. This site-specific analysis is tiered to the programmatic environmental impact statement (USDA 1995). As part of the analyses conducted for the FEIS, human health and ecological risk assessments were prepared (Human Health Risk Assessment, Appendix F to the FEIS and Ecological Risk Assessment, Appendix G to the FEIS). The purpose of tiering is to eliminate repetitive discussions of the issues addressed in the FEIS (40 CFR, 1502.20 and 1508.28 in Council on Environmental Quality, 1992).

1.6 Summary of Public Involvement and Notification

Public meetings were held during February 2003 (Table 2). Notices were delivered to elected officials, interested groups, residents and local media. At each meeting, state officials presented alternatives for gypsy moth management. The discussion included identification and biology of gypsy moth, pest impacts, survey methods, and control tactics. The proposed actions and alternatives, including no action, were discussed. Local issues, questions and concerns raised at the public meetings are in Appendix A.

Table 2. Date and Number Attending Public Meetings in Each County.

COUNTY	DATE OF PUBLIC MEETING	# OF ATTENDEES
Lake	February 11, 2003	28
Porter	February 11 & 12, 2003	28
LaPorte	February 12, 2003	26
St. Joseph	February 13, 2003	31
Allen	February 17, 2003	24
Kosciusko	February 18, 2003	17
Noble	February 20, 2003	11
Whitley	February 20, 2003	23

Information gathered at the public meetings and from resource professionals was used to develop issues and concerns related to the project. They are grouped into two categories; 1) issues used to formulate alternatives, and 2) other issues and concerns.

1.7 Issues Used to Formulate the Alternatives

Each of the major issues is introduced in this section. Discussion pertaining directly to each issue as it relates to the alternatives can be found in Chapter 4.

Issue 1 - Human Health and Safety. Three types of risk are addressed under this issue: 1) an aircraft accident during applications, 2) treatment materials and potential effects on people, and 3) the future effects of gypsy moth infestations on people.

Issue 2 - Effects on Nontarget Organisms and Environmental Quality. The major concerns under this issue are 1) the impact of treatment materials to nontarget organisms, including threatened and endangered species that may be in the treatment sites, and 2) the future impacts of gypsy moth defoliation on the forest resources, water quality, wildlife and other natural resources.

Issue 3 - Economic and Political Impacts of Treatment vs. Non-Treatment. Gypsy moth outbreaks can have significant economic impacts due to effects on the timber resource, nursery and Christmas tree producers, and recreational activities. An additional economic impact is a gypsy moth quarantine imposed to regulate movement of products from the forest, nursery and recreational industries to uninfested areas.

Issue 4 - Likelihood of Success of the Project. Reducing the spread rate of gypsy moth within Indiana is the objective of this project. Alternatives vary in their likelihood of success for the current situation in Indiana. Consideration of project success is important for delaying gypsy moth impacts to Indiana and neighboring states.

1.8 Other Concerns and Questions

Concerns and questions were discussed during the public meetings (see Appendix A). Also, other agencies were consulted (see Appendix C). Information from these sources was used to develop mitigating measures, management requirements and constraints.

1.9 Summary of Authorizing Laws and Policies

State. The Division Director (State Entomologist) may cooperate with a person in Indiana to locate, check, or eradicate a pest or pathogen (Indiana Code 14-24-2-1). The Division Director may, on the behalf of the department, enter into a cooperative agreement with the United States government, the government of another state, or an agency of the United States or another state to carry out this article (Indiana Code 14-24-2-2). Aerial applicators must meet Indiana Pesticide Use and Application Law (Indiana Code 15-3-3.6) to provide safe, efficient and acceptable applications of pesticides. The Non-Game and Endangered Species Conservation law (Indiana Code 14-22-34) applies to this project.

Federal. Authorization to conduct treatments for gypsy moth infestations is given in the Plant Protection Act of 2000 (7 U.S.C. section 7701 et.seq.).

The Cooperative Forestry Assistance Act of 1978 provides the authority for the USDA and state cooperation in management of forest insects and diseases. The law recognizes that the nation's capacity to produce renewable forest resources is significantly dependent on non-federal forestland.

The 2002 Farm Bill (P.L. 107-171d.) reauthorizes the basic charter of the Cooperative Forestry Assistance Act of 1978.

The National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190), 42 USC 4321 et seq. requires a detailed environmental analysis of any proposed federal action that may affect the human environment. The courts regard federally funded state actions as federal actions.

The Federal Insecticide, Fungicide and Rodenticide Act of 1947, (7 USC 136) as amended, known as FIFRA, requires insecticides used within the United States be registered by the United States Environmental Protection Agency (EPA).

Section 7 of the Endangered Species Act prohibits federal actions from jeopardizing the continued existence of federally listed threatened or endangered species or adversely affecting critical habitat of such species.

Section 106 of the National Historical Preservation Act and 36 CFR Part 800: Protection of Historic Properties requires the State Historic Preservation Officer be consulted regarding the proposed activities.

USDA Departmental Gypsy Moth Policy (USDA 1990) assigns the USFS and APHIS responsibility to assist states in protecting non-federal lands from gypsy moth damage.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Process Used to Formulate the Alternatives

Staff entomologists and administration within the IDNR, Division of Entomology and Plant Pathology and the Division of Forestry in cooperation with USDA Forest Service, formulated several alternatives to treat the gypsy moth populations in Indiana under the slow-the-spread strategy (See Chapter 6, Persons and Agencies Consulted).

The FEIS (USDA 1995), which this document is tiered to, allows the USDA to participate in the Cooperative Gypsy Moth Project for Indiana. The USDA can assist in conducting eradication, slow-the-spread and suppression strategies. The FEIS lists the treatment options for each of the strategies (USDA 1995, Vol. II, p.2-15). For the slow-the-spread strategy, the following six treatment options may be considered: 1) *Bacillus thuringiensis* var. *kurstaki* (Btk), 2) diflubenzuron (Dimilin), 3) nucleopolyhedrosis virus (Gypchek), 4) mass trapping, 5) mating disruption (pheromone flakes), and 6) sterile insect release. These treatment options from the FEIS were used as the alternatives for the site-specific analysis of this Environmental Assessment.

2.2 Alternatives Eliminated from Detailed Study

The following alternatives that are available were eliminated from consideration:

Diflubenzuron (Dimilin). The label for diflubenzuron (Dimilin) prohibits its use over wetlands and directly to water. Some treatment sites contain lakes, marsh, rivers and/or wetlands. Therefore, its use was not considered for this project. This does not preclude the consideration and use of Dimilin in future projects.

Gypsy moth specific nucleopolyhedrosis virus (Gypchek). Gypsy moth nucleopolyhedrosis virus (Gypchek) has a very limited supply and is targeted for use in special areas that have high environmental concerns. There are questions concerning Gypchek effectiveness in low-level gypsy moth populations. It is preferably used in suppression projects against moderate to high gypsy moth populations. Therefore, NPV is not considered for this project. In future projects, it will be evaluated for use.

Sterile insect release. The FEIS documents the use of sterile insects for elimination of isolated gypsy moth populations. It also documents the obstacles of using this alternative - the limited release period; need to synchronize production of sterile pupae and release into the population; and the limited availability. This treatment alternative is currently not available, and it has not used in recent eradication or slow-the-spread treatment projects. Giving consideration to these obstacles, this alternative was not considered for this project. In future projects, it will be evaluated for use.

2.3 Alternatives Considered in Detail

Alternative 1 - No action. If no action is taken, the gypsy moth will reproduce and populations will begin to defoliate trees in the area. Gypsy moth populations will develop and spread to surrounding areas. This is not a preferred alternative because damage and regulatory action will occur sooner than if other alternatives are selected.

Alternative 2 - Btk. This treatment option uses two applications of Btk at 30 billion international units (BIU) per acre applied from air or ground. The applications would begin when leaf expansion is near 50% and when first and second instar caterpillars are present and feeding. This usually occurs between late April and late May in Indiana. The second application would follow 7-10 days after the first application. Most commercial formulations of Btk are aqueous flowable suspension (e.g., trade names: Foray, Thuricide) with application rates of 8-48 BIU per acre (Appendix D – example of product labels). For aerial application at 30 BIU, less than 3.0 quarts of the product would be applied per acre.

Btk has been a commonly used treatment option in Cooperative Gypsy Moth Projects in Indiana and other states. Btk is a naturally occurring soil-borne bacterium that is mass-produced and formulated into a commercial insecticide. The Btk strain is effective against caterpillars, including the gypsy moth caterpillar. Caterpillars ingest Btk while eating the foliage. Once in the midgut, Btk becomes active and causes death within a few hours or days (USDA 1995, Vol. II, p. A3-A5). Btk may impact nontarget species of spring-feeding caterpillars in the treatment sites, but the impact to the local population is usually very minimal as Btk rapidly degrades on the foliage within a few weeks, and the nontarget lepidopterans generally re-colonize treatment sites in less than 2 years (USDA 1995, Vol. II, p. 4-52 to 4-55). Human exposure to Btk provides little cause for concern, though direct exposure to the spray may cause temporary eye and respiratory tract irritation in a few people (USDA 1995, Vol. II, p. 4-13).

Btk has proven effective at eliminating gypsy moth at all population levels. Btk applications can meet the project objectives of eliminating gypsy moth populations from all of the proposed treatment sites.

Alternative 3 - Mating disruption. This treatment option uses one aerial application of pheromone flakes prior to the emergence of male moths. This would occur in mid-June to early July. Mating disruption relies on the attractive characteristics of the gypsy moth sex pheromone, disparlure. The objective of mating disruption is to saturate the treatment area with enough pheromone sources to confuse the male moths and prevent them from finding and mating with female moths. Mating disruption is considered specific to gypsy moth and is not known to cause impacts to nontarget organism populations, water quality, microclimate, or soil productivity and fertility (USDA 1995, Vol. II, p. 4-67).

Mating disruption involves the aerial application of plastic flake dispensers that are impregnated with the gypsy moth pheromone. The formulation of Disrupt II (see Appendix D – example of product labels) consists of small plastic flakes, approximately 1/32 inch x 3/32 inch (1 x 3 mm) in size, thus the name “pheromone flakes”. A sticker, Monsanto's Gelva 2333, is applied to the flakes as they are dispersed from the aircraft, which aids in the distribution of the flakes throughout all levels in the forest canopy where mating could potentially occur. The flakes are green in color and applied at a rate of 6, 15 or 30 grams active ingredient (disparlure) per acre. At the high rate of 30

grams, 170 grams of flakes are applied in 4 fluid ounces of sticker per acre (4 flakes per sq.ft.) (Reardon et al. 1998). All of the ingredients in the Gelva 2333 sticker are considered non-hazardous to public health if used as an additive in the insecticide formulation (40 CFR 180.1001).

Pheromone flakes have proven effective at eliminating gypsy moth at very low population levels. The application of pheromone flakes can meet the project objectives of eliminating gypsy moth populations from most of the proposed treatment sites.

Alternative 4 - Mass trapping. This treatment option places gypsy moth traps at a close spacing within the treatment sites. “The objective of this treatment is to capture male gypsy moths before they have a chance to locate and mate with female moths” (USDA 1995, Vol II, p. A-7). “For mass trapping, delta or milk carton traps are deployed in an intensive grid pattern in an infested area and an adjacent buffer area at the rate of at least 9 traps per acre” (USDA 1995, Vol. II, p. A-8). Thus, it is very labor intensive, especially over large areas. Typically, mass trapping is used on small infestations of less than 40 acres.

Mass trapping has proven capable of eradicating gypsy moth at very low population levels in isolated introductions. The use of mass trapping can meet the project objectives of eliminating gypsy moth populations from some of the proposed treatment sites.

Alternative 5 - Btk, mating disruption and mass trapping (Preferred Alternative). The use of this alternative provides flexibility to select Btk, mating disruption, or mass trapping alone or in combination for each site based on the following criteria: 1) gypsy moth population level, 2) habitat type (urban or rural), 3) nontarget organisms, 4) safety and 5) cost and project efficiency. The use of this alternative can meet the project objectives of eliminating gypsy moth populations from all of the proposed treatment sites.

2.4 Comparative Summary of Alternatives

Table 3. Summary of Environmental Consequences for Alternatives by Issues.

	Issue 1 Human Health & Safety	Issue 2 Effects on Nontarget Organisms & Environmental Quality	Issue 3 Economic and Political Impacts	Issue 4 Likelihood of Success of the Project
Alternative 1 No Action	<ul style="list-style-type: none"> - No risk of an aircraft accident or spill. - No risk of Btk contact with humans. - Gypsy moth outbreaks will occur sooner with the associated nuisance and health impacts to humans. 	<ul style="list-style-type: none"> - No direct risk to nontarget organisms, including threatened and endangered species. - Future gypsy moth impacts will occur sooner, which includes defoliation and reduction in the oak component of forest stands. 	<ul style="list-style-type: none"> - Regulatory action would occur sooner. - Spread of gypsy moth through these counties and into adjacent counties would not be slowed. 	<ul style="list-style-type: none"> - Gypsy moth would not be eliminated from treatment sites and project objective would not be met.
Alternative 2 Btk	<ul style="list-style-type: none"> - Slight risk of aircraft accident and pesticide spill. - Contact with Btk may cause mild and temporary irritation (eye, skin & respiratory) to a few people. - Delay effect of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - Direct impact on spring feeding caterpillars, temporary reduction in local populations. - Indirect impact on nontarget organisms that feed on caterpillars is unlikely due to small percent of habitat treated. - No risk to Karner blue butterfly and Mitchell's satyr as neither species occur in or near treatment sites. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites.
Alternative 3 Mating disruption	<ul style="list-style-type: none"> - Slight risk of aircraft accident. - No effect to human health. - Delay effect of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - No risk to nontarget organisms, including threatened and endangered species. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites with very low populations.
Alternative 4 Mass trapping	<ul style="list-style-type: none"> - No risk of aircraft accident or spill. - No risk of Btk contact with humans - No effect to human health - Delay effects of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - No risk to nontarget organisms, including threatened and endangered species. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. - Cost is prohibitive in large treatment sites. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites with very low populations.
Alternative 5 Btk, Mating disruption and mass trapping	<ul style="list-style-type: none"> - Same as alternative 2, 3 or 4 depending on the treatment at each site. 	<ul style="list-style-type: none"> - Same as alternative 2, 3 or 4 depending on the treatment at each site. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites.

3.0 AFFECTED ENVIRONMENT

3.1 Description of the Proposed Treatment Sites

Allen County: There are approximately 422,000 acres in Allen County and 30,500 acres of forest that contain both favorable and unfavorable host species.

Northwest Allen: The proposed treatment site contains 1850 acres consisting of eight separate blocks. This site is composed of rural residences, farmland and woodlots. US Hwy 33 runs through the site with three blocks to its east and five blocks to its west. US Hwy 30 is south of the site. Rural residences are present in and/or adjacent to each of the eight blocks. One block on the west side of the treatment site (which contains Fisher, Butt and East Road) has a community center and park. The south border of this block is Lake Everett. The area surrounding each block is farmland (pasture or crop fields). Other businesses within or nearby the site include a nursery and a peat/moss facility. The woodlots in this site contain a variety of species including oak, maple, sycamore, elm, pine and spruce. Rural residential lots have shrubs and a similar variety of trees. A high voltage line runs through the block at Dunn Mill and southeast of one other block. Gypsy moth was detected in this site in 2001 and delimited in 2002. The moth catch in these surveys indicates a very low population. Surveys did not detect eggmasses. Mating disruption using pheromone flakes is proposed for this site because the gypsy moth population is very low.

Kosciusko County: There are approximately 344,000 acres in Kosciusko County, and 42,100 acres of forest that contain both favorable and unfavorable host species.

Pierceton: The proposed treatment site contains 57 acres. The site is rural with a cemetery at the center of the site. State Hwy 13 runs north and south through the site. Rural residences are present in the site with conifers and hardwoods lining the residential properties. The site is composed of fields with scattered trees and trees in fencerows. The trees in the site are mostly hardwoods – maple, oak, ash, elm, other hardwoods and shrubs. Two ponds formed by old gravel pits are present in the site. Gypsy moth was detected in 1999, delimited in 2000, treated with mating disruption in 2001 and ground treated 20 trees (in cemetery) plus mass trapping in 2002. Btk is proposed for this site because the gypsy moth population is low and because past treatments have not totally eliminated gypsy moth.

Lake County: There are approximately 320,500 acres in Lake County, and 18,500 acres of forest that contain both favorable and unfavorable host species.

Brookwood: The proposed treatment site contains 150 acres. The site is urban residential and contains houses and businesses. Two golf courses are the east and south border of the site. State Hwy 55 is the west border. A school is located outside of the site from the northeast corner. The urban forest is composed of oak, maple, elm, ash and other hardwoods. Gypsy moth was detected in 2001 and delimited in 2002. A small number of eggmasses were found in 2002. The surveys indicate a low population. Btk is proposed for this site because the gypsy moth population is low, there are no concerns about threatened and endangered species and the site has a contiguous urban forest canopy.

LaPorte County: There are approximately 384,000 acres in LaPorte County and 42,200 acres of forest that contain both favorable and unfavorable host species.

SR4 & CR200E: The proposed treatment site contains 17 acres near the intersection of State Road 4 and County Road 200 East. The site is a rural residence and farm with a small woodlot, yard, and field trees. The site contains oak, maple and other hardwoods. Crop fields surround the site, and a small wet area is outside the northwest corner of the site. Gypsy moth was detected in 2000 and delimited in 2001 and 2002. A survey detected eggmasses in the site in 2002. Btk is proposed for this site because the gypsy moth population is low.

Oakwood: The proposed treatment site contains 1932 acres. The site is rural forests, farmland and residential subdivisions. The forest area is composed of oak, maple, other hardwoods and conifers. Abandoned orchards are present in the site. Man-made ponds are present in the site. Radio towers are present in the site. Gypsy moth was detected in 2000 and delimited in 2001 and 2002. The site is proposed for mating disruption using pheromone flakes because of the very low population of gypsy moth.

Marshall County: There are approximately 284,400 acres in Marshall County and 32,300 acres of forest that contain both favorable and unfavorable host species.

Bremen: The proposed treatment site contains 26 acres. The site is rural woodlots surrounded by farmland. There are three residences in the site. The woodlots contain oak, maple, black cherry and other hardwoods. Gypsy moth was detected in 2000 and delimited in 2001 and 2002. No eggmasses were found in 2001 and 2002. Mating disruption using pheromone flakes is proposed for this site because the gypsy moth population is very low and no other life stages were detected.

Juniper Rd: The proposed treatment site contains eight acres. The site contains a rural woodlot and residence. The woodlot contains oak, maple, black cherry, hackberry and other hardwoods. The site is surrounded by farmland. A railroad is located south of the site. A wet area is southwest of the site. Gypsy moth was detected in 1999 and delimited in 2000, 2001 and 2002. In 2001, eggmasses were found on two trees and hand treated. Only four eggmasses were found in 2002. Mating disruption using pheromone flakes is proposed for this site because the gypsy moth population is very low.

Noble County: There are approximately 264,000 acres in Noble County, and 33,600 acres of forest that contain both favorable and unfavorable host species.

Chain of Lake SP: The proposed treatment site contains 961 acres. This site is a state park and a small area of rural residences and farmland. It is largely forested, but also contains open prairies, several lakes, open fields and cropland. The forest is composed of oak, maple, ash, elm, pine, cherry, and black locust. The state park contains campgrounds, cabins, hiking trails, lakes and other recreational areas. Outside the proposed treatment area is a beach and a State Department of Corrections facility. There is a high voltage line on the northeast corner of the treatment site. Gypsy moth was detected in the park in 2001 and delimited in 2002. Two egg masses detected in 2001 were treated and removed. No egg masses were found during the 2002 survey. Mating disruption using pheromone flakes is proposed for this site because the gypsy moth population is very low and no other life stages were found in 2002.

Porter County: There are approximately 278,100 acres in Porter County and 29,300 acres of forest that contain both favorable and unfavorable host species.

Dunes SP: The proposed site contains 1810 acres. The site contains the Dunes State Park, the Dunes National Lakeshore and residences in Porter Beach and Dunes Acres. The site is primarily forest containing oak, maple, pine, hickory and other hardwoods. The understory of the forest contains witch hazel, maple, spicebush and oak. Part of the northern border of the site is Lake Michigan. Cowles Bog is outside the western border. The South Shore Rail Line is the south border. There are water and radio towers in the site. The northwest part of the site has been treated for gypsy moth in 1999. Gypsy moth was detected in 2001 and delimited in 2002. The site is proposed for mating disruption using pheromone flakes because the population is very low and because Karner blue butterfly, *Lycaeides melissa samuelis*, is in the Dunes National Lakeshore area. The Porter site is south of this site and is separated by the South Shore Rail Line.

Porter: The proposed site contains 2819 acres. The site contains part of the towns of Porter and Chesterton. The site contains the Dunes National Lakeshore. The site is primarily forest, forest residential areas, and urban residential areas. The site also contains businesses and recreation areas. The forest contains oak, maple, hickory, pine and other hardwoods. The residential areas contain the same species of hardwoods plus other conifers and shrubs. The site adjoins the Dunes SP site to the north. The south border is Interstate 94 and US Hwy 20 runs through the site. Gypsy moth was detected in 2001 and delimited in 2002. The site is proposed for mating disruption using pheromone flakes because the population is very low and because Karner blue butterfly, *Lycaeides melissa samuelis*, is in the Dunes National Lakeshore area.

Furnessville: The proposed site contains 1161 acres. The site contains the Dunes State Park and the Dunes National Lakeshore. The site is forest and rural residences. The forest contains oak, maple, hickory, pine and other hardwoods. The residential areas contain the same species of hardwoods plus other conifers and shrubs. US Hwy 20 and the South Shore Rail Line run through the site. There are radio towers and power line towers in the site.

Gypsy moth was detected in the site in 2001 and delimited in 2002. The surveys identified a very low gypsy moth population in the site and low gypsy moth populations in the core area. Mating disruption using pheromone flakes is proposed for the site because the population is very low and because Karner blue butterfly, *Lycaeides melissa samuelis*, is in the Dunes National Lakeshore area. Btk is proposed for the core area because the low population is above the threshold for mating disruption.

Furnessville Core: The proposed site contains 139 acres. The site is forest and rural residences. The site does not contain the Dunes State Park or Dunes National Lakeshore. The site is the southern part of the Furnessville site. Gypsy moth was detected in 2001, delimited in 2002, and eggmasses were found in the core area in 2002. These surveys indicate the gypsy moth population is low. Btk is proposed for this core area because the gypsy moth population is above the threshold for application of mating disruption.

Furnessville South: The proposed site contains 383 acres. The site is rural forest with some rural residences. The site is bisected by Interstate 94 and a railroad runs through the northern

part of the site. The forest contains oak, maple, ash, hickory, elm and other hardwoods. Outside the west border, two weigh stations for the interstate have security lights above tree canopy. Gypsy moth was detected in 2001 and delimited in 2002. The surveys detected a very low population. Mating disruption using pheromone flakes is proposed for this site because the gypsy moth population is very low.

St. Joseph County: There are approximately 292,700 acres in St. Joseph County, and 27,400 acres of forest that contain both favorable and unfavorable host species.

South Bend: The proposed site contains 5,959 acres. The site is northeast of South Bend and is part of the metropolitan area around South Bend. The north border of the site is the Indiana-Michigan border. The site is classified as “urban residential” and contains houses, businesses, churches and three schools. The urban forest is mainly oak mixed with maple, black walnut, black cherry, other hardwoods and landscape trees such as spruce, crabapple and ash.

Gypsy moth was detected in 2001 and delimited in 2002. The surveys identified a very low population in the site and low gypsy moth populations in the core areas. Mating disruption using pheromone flakes is proposed for the site because of the very low population. Btk is proposed for the core area because the low population is above the threshold for mating disruption.

South Bend Core: The proposed treatment site contains 266 acres. The site is a wooded residential area and contains oak, maple, black walnut, black cherry and other hardwoods. Gypsy moth was detected in 2001, delimited in 2002, and eggmasses were found in the core area in 2002. These surveys indicate the gypsy moth population is low. Btk is proposed for this core area because the gypsy moth population is above the threshold for application of mating disruption.

Shively Rd: This proposed site contains 8 acres. The site is a rural crop field with an isolated oak tree with eggmasses. Gypsy moth was detected in 2000, delimited in 2001 and mass trapped in 2002. The site is proposed for Btk, aerial application, because the population of gypsy moth is low and there is no access for ground application of Btk.

Whitley County: There are approximately 214,800 acres in Whitley County, and 27,900 acres of forest that contain both favorable and unfavorable host species.

Churubusco: The proposed site contains 45 acres. This site is within the city limits of Churubusco. The site contains residences, a city park and a forested area. The city park in the treatment site contains ball fields and a tennis court. Within the city park are mature oak trees. The residential area of the site contains oak, hickory, maple, spruce, pine, and shrubs. The site also contains a woodlot composed of oak, hickory and other hardwoods. There are light towers within and near the site associated with the ball fields. Outside the south boundary of the site is an elementary and high school.

Surveys in 2000 and 2001 detected the presence of gypsy moth in the area of the proposed treatment site. In 2002, moth catches indicated a low population. Egg masses were found in the city park. Btk is proposed for this site because the population is low.

US 33: This proposed treatment site contains 3 acres. US Hwy 33 is the south border of the site. The site is rural residential containing oak, pine spruce, fruit trees and shrubs. Open fields surround the site. The survey detected gypsy moth in the area in 2001. The survey detected a high moth trap in the site in 2002. An eggmass survey detected new and old eggmasses in the site. Btk is proposed for the site because the gypsy moth population level is low.

3.2 Threatened and Endangered Species

Consultation with the staff of the U.S. Fish and Wildlife Service determined that neither of the federally endangered species Karner blue butterfly (*Lycaeides melissa samuelis*) and Mitchell's satyr butterfly (*Neonympha mitchellii*) are known to occur near the sites proposed for treatment using Btk. The use of pheromone flakes are considered to be highly specific for gypsy moth with no adverse impacts on federally listed butterflies. (Appendix C – U.S. Fish & Wildlife Letter).

The treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*) and copperbelly watersnake (*Nerodia erythrogaster neglecta*). Adverse effects are not likely to the above species due to the limited range of the proposed project. "Given the very limited range of the current Bt spraying program and the specificity of pheromone treatment, the proposed project is not likely to adversely affect these listed species." (Appendix C – U.S. Fish & Wildlife Letter).

The IDNR, Environmental Unit reviewed the project. The Unit indicated, "the proposed project will not knowingly impact any state or federally endangered species" (Appendix C – IDNR, Memo).

3.3 Protection of Historic Properties

The State Historic Preservation Officer did not identify any historic buildings, structures, objects, districts or archaeological resources listed in or eligible for inclusion in the National Register of Historic Places within the probable area of potential effects. Nor did the Officer identify any historic properties within the project area that are listed in the Indiana Register of Historic Sites and Structures or that might otherwise be considered historic as the term is used in Indiana Code 14-21-1-18. (Appendix C – IDNR Letter Division of Historic Preservation and Archaeology).

4.0 ENVIRONMENTAL CONSEQUENCES

This section is the scientific and analytic basis for the comparison of alternatives. It describes the probable consequences (effects) of each alternative for each issue. Environmental consequences are summarized in Table 3 for each combination of the alternatives and issues.

4.1 Human Health and Safety (Issue 1).

Alternative 1 – No action. For this alternative, there would be no cooperative project, therefore risk of human contact with pheromone flakes or Btk and an aircraft accident during application would not exist. However, future impacts by gypsy moth to human health will occur sooner under Alternative 1 than if treatments are used to slow-the-spread of these gypsy moth populations. Gypsy moth outbreaks have been associated with adverse human health effects, including skin lesions, eye irritation, and respiratory reactions. Gypsy moth caterpillars can become a serious nuisance that can cause psychological stress in some individuals (USDA 1995, Vol. II, p. 4-9).

Alternative 2 - Btk. Human exposure to Btk provides little cause for concern about health effects. “On the basis of both the available epidemiology studies as well as the long history of use, no hazard has been identified for members of the general public exposed to Btk formulations” (USDA 1995, Vol. III, p. 4-15). Exposure to Btk may result in temporary eye, skin, and respiratory tract irritation in a few people. A detailed analysis of the risks posed to humans by Btk was conducted for the FEIS -- Human Health Risk Assessment (USDA 1995, Vol. III). Glare and O’Callaghan provide a comprehensive review of *Bacillus thuringiensis*, including Btk. They conclude with this statement, “After covering this vast amount of literature, our view is a qualified verdict of safe to use.” (Glare and O’Callaghan, 2000)

A slight risk of an accident always exists when conducting aerial applications – Btk uses two applications. To further reduce this risk, a detailed work and safety plan is required prior to program implementation, which outlines guidelines for aircraft inspections, Btk loading, and conditions for safe applications. The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 3 – Mating disruption. The toxicity of insect pheromones to mammals is relatively low and their activity is target-specific. Therefore the EPA requires less rigorous testing of these products than of conventional insecticides. Risk to human health due to exposure to disparlure, the active ingredient in pheromone flakes, is discussed in the FEIS (USDA 1995, Vol. II, pp. 4-30 to 4-32). Once absorbed through direct contact, disparlure is very persistent in humans, and individuals exposed to disparlure may attract adult male moths for prolonged periods of time. This persistence is viewed as a nuisance and not a health risk (USDA 1995, Vol. III, 8-1). In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA 1995, Vol. IV, 5-5) therefore no effects to human health are anticipated.

A slight risk of an accident always exists when conducting aerial applications – mating disruption uses one application. To further reduce this risk, a detailed work and safety plan is required prior to program implementation, which outlines guidelines for aircraft inspections, pheromone flake loading, and conditions for safe applications. The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 4 – Mass trapping. The human health effects are not anticipated from the use of disparlure in the delta traps (see Alternative 3 above). The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 5 – Btk, mating disruption, and mass trapping. For this alternative, the treatment sites identified for Btk would have the human health and safety consequences stated above for Alternative 2. The treatment sites identified for mating disruption would have the human health and safety consequences stated above for Alternative 3. The treatment sites identified for mass trapping would have the human health and safety consequences stated above for Alternative 4.

4.2 Effects on Nontarget Organisms and Environmental Quality (Issue 2).

Alternative 1 – No action. With no treatments in the current year, future impacts by the gypsy moth would occur sooner. Defoliation by the gypsy moth will cause selective mortality of preferred host trees. During outbreaks, forest ecosystems can change due to a reduction of the oak component and an increase of tree species that are less desired by gypsy moth, such as maple and ash. Oak forests would likely consist of a more mixed composition in the future, though oak would still be a component.

Gypsy moth defoliation and subsequent tree mortality can affect nontarget organisms by dramatically changing habitats on a local scale. Heavy defoliation can remove food for other leaf-feeding species, including other caterpillars. However, it can also create new habitat for some species by creating snags and increasing understory plant development by increasing light penetration into defoliated areas. Impacts on a larger scale (national, regional, or state) are subtle, gradual, and may be noticeable only after many years or decades (USDA 1995, Vol. II, p. 4-74). Short- and long-term changes in nontarget species have been shown for moderate and heavy defoliation (USDA 1995, Vol. II, p. 4-47 and 4-50). An Ecological Risk Assessment (USDA 1995, Vol. IV) examined gypsy moth impacts on a wide variety of species (mammals, birds, reptiles, amphibians, fish, insects, mollusks, crustaceans, and other invertebrates). Further discussion of gypsy moth and its impact on forest conditions can be found in the FEIS (USDA 1995, Vol. II, p. 4-41 and 4-74).

Alternative 2 - Btk. Btk can have direct and indirect impacts on nontarget organisms. Direct toxicity of Btk is generally limited to the larval stage of moth and butterfly species. Btk is not toxic to vertebrates, honey bees, parasitic and predatory insects, and most aquatic invertebrates (USDA 1995, Vol. IV, p. 5-1). Btk has a direct adverse impact on caterpillars of moths and butterflies, but susceptibility varies widely among species. Btk, as used in gypsy moth projects, poses a risk to some spring-feeding caterpillars; however, permanent changes in their populations do not appear likely. An exception may occur in certain habitats that support small isolated populations of a particular species of moth or butterfly that is highly susceptible to Btk (USDA 1995, Vol. II, p. 4-54). The U.S. Fish and Wildlife Service identified two federally endangered butterflies - Karner blue butterfly (*Lycaeides melissa samuelis*) and the Mitchell's satyr butterfly (*Neonympha mitchellii*). However, these species are not known to occur near the treatment sites (Appendix C - U.S. Fish & Wildlife Letter). Thus, no potential exists for Btk to impact these populations directly.

Btk may have an indirect effect on other organisms by a reduction in their food resource (e.g. caterpillars, pupae, or adult moths and butterflies). Any effects on vertebrates due to reduction in food availability are probably subtle, especially for mammals and birds that are very mobile.

Populations of some gypsy moth parasites and some general lepidopteran parasites may be reduced, due to the reduction in number of potential hosts caused by the Btk spray (USDA 1995, Vol. IV, p. 5-7). The U.S. Fish & Wildlife letter identified the treatment sites within the range of the endangered Indiana bat, *Myotis sodalis*. Moths are the main food source for the Indiana bat. However, given the limited range of the current project, it is not likely that this project will adversely affect the Indiana bat. The U.S. Fish & Wildlife letter identified that the range of the bald eagle, *Haliaeetus leucocephalus*, and copperbelly watersnake, *Nerodia erythrogaster neglecta*, encompassed the treatment sites. “Given the very limited range of the current Bt spraying program and the specificity of pheromone treatment, the proposed project is not likely to adversely affect these listed species.” (Appendix C – U.S. Fish & Wildlife Letter).

Applications of Btk formulations do not increase levels of Btk in soil, and Btk persists for a relatively short time in the environment. Changes in soil productivity and fertility are not likely in the treatment sites, because Btk occurs naturally in soils worldwide. Additional information concerning the effects to soil can be found in Appendix G of the FEIS (USDA 1995, Vol. IV).

Application of Btk is likely to maintain the forest condition in the short-term by eliminating gypsy moth populations in the treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in these counties; even if this alternative is implemented.

Alternative 3 – Mating disruption. The pheromone in the flake dispenser is specific to gypsy moth, and it will not affect other insects, including any threatened and endangered species of butterflies or moths.

A quantitative assessment of risk from mating disruption was not conducted for the FEIS because of disparlure’s low toxicity to vertebrates and specificity to gypsy moth. As used in mating disruption, disparlure is not likely to impact nontarget organisms (USDA 1995, Vol. II, p. 4-67). The toxicity of insect pheromones to mammals is relatively low. In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA 1995, Vol. IV, 5-5). At normal application rates, concentration of the pheromone (disparlure) impregnated in the flakes remains active for one season only. Therefore, no effects on nontarget organisms are anticipated from the proposed Disrupt II application.

Most ingredients in the flakes are insoluble in water, so the risk of disparlure leaching into groundwater is minimal. To determine the amount of disparlure that could potentially leach into water, 50 grams of flakes were submerged in 150 ml of water and vigorously agitated for 24 hours. Results indicate that less than 0.04% of the active ingredient (disparlure) contained in the flakes leached into water under these conditions. Disrupt II is applied at doses of 6, 15 or 30 grams of active ingredient (disparlure) per acre and 90% of the flakes are intercepted by and adhere to the forest canopy, where they remain until they have released most of the disparlure.

Using pheromone flakes to disrupt mating is likely to maintain the forest condition in the short-term by eliminating gypsy moth populations in the treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in these counties; even if this alternative is implemented.

Alternative 4 - Mass trapping. The pheromone in the delta trap is specific to gypsy moth and will not have an effect on other insects or threatened and endangered species of butterflies or moths.

“Mass trapping does not affect nontarget organisms, except those (primarily flying insects) that accidentally find their way into the trap.” (USDA 1995, Vol. II, p. A-9).

Mass trapping is likely to maintain the forest condition in the short-term by eliminating gypsy moth populations in the treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in these counties; even if this alternative is implemented.

Alternative 5 - Btk, mating disruption, and mass trapping. For this alternative, the treatment sites identified for Btk would have the nontarget and environmental consequences stated above for Alternative 2. The treatment sites identified for mating disruption would have the nontarget and environmental consequences stated above for Alternative 3. The treatment sites identified for mass trapping would have the nontarget and environmental consequences stated above for Alternative 4.

4.3 Economic and Political Impacts of Treatment vs. Non-Treatment (Issue 3).

Alternative 1 – No action. If no treatments were applied, the likely action would be to implement a quarantine in these counties during the next year. A quarantine would regulate movement of firewood, logs, other timber products, mobile homes, recreational vehicles, trees, shrubs, Christmas trees, and outdoor household articles. This would create a financial impact to industries that deal with these products.

If current populations are not treated, they will continue to reproduce and grow in size. Defoliation would become noticeable in the future, but it would be difficult to predict exactly when noticeable defoliation would occur. Requests for federal assistance to suppress gypsy moth would be likely when defoliation occurs. Suppression projects are generally more expensive in total dollars than eradication projects because much larger areas are treated. The economic impact to state budgets would increase, as responsible agencies would need to administer and fund these suppression projects.

Following defoliation, negative financial impacts are likely to occur for recreational industries such as resorts and campgrounds. Homeowners, private woodland owners, and forest-based industries could be impacted by gypsy moth treatment costs, tree mortality, and adverse human health effects.

Alternative 4 – Mass trapping. If treatments are applied, regulatory action is not likely for these counties during the next year and the impacts listed under Alternative 1 would be delayed. Mass trapping is typically used in small areas (less than 40 acres) because it is labor intensive (USDA 1995, Vol. II, p. A8-9). Its use for all treatment sites would be cost prohibitive.

Alternatives 2 (Btk), 3 (Mating disruption) and 5 (Btk, mating disruption, and mass trapping). If treatments are applied, regulatory action is not likely for these counties during the next year and the impacts listed under Alternative 1 would be delayed.

Economic analysis from the Slow-The-Spread Program (STS) demonstrated the use of Btk, mating disruption and other STS technology reduced the spread of gypsy moth by as much as 60 percent (USDA 1997). The Eastern Plant Board recognized that the benefit of delaying gypsy moth resulted in an economic benefit of \$22.00 for each dollar invested in treatment cost and that the STS Program protected timber, recreation, and private property values (Eastern Plant Board 1997).

4.4 Likelihood of Success of the Project (Issue 4).

Alternative 1 – No action. Project objectives would not be met with this alternative. Gypsy moth would not be eliminated from the treatment sites, and its population would serve as a source for increased spread within the counties and into surrounding counties. If these populations were allowed to increase and expand, gypsy moth could spread through the state in 10-15 years (USDA 1997)

Alternative 2 - Btk. Project success is likely with this alternative. Btk is effective in eliminating gypsy moth in the treatment sites with low gypsy moth populations.

Alternative 3 – Mating disruption. Project success is likely with this alternative in most sites. However, a few sites have gypsy moth populations in core areas above the recommended level for treatment with mating disruption.

Alternative 4 – Mass trapping. Project success is likely with this alternative in some sites. However, a few sites have gypsy moth populations in core areas above the recommended level for treatment with mass trapping. Mass trapping is a labor-intensive treatment and sites greater than 40 acres are usually not mass trapped. It would not be feasible to mass trap all treatment sites.

Alternative 5 - Btk, mating disruption, and mass trapping. Project success is optimized with this alternative when treatment selection criteria are used to determine the use of Btk, mating disruption or mass trapping alone or in combination for each site. Treatment selection criteria used to evaluate each site are: 1) gypsy moth population level, 2) habitat type (urban or rural), 3) nontarget organisms, 4) safety, and 5) cost and project efficiency.

4.5 Unavoidable Adverse Effects

No unavoidable adverse effects were identified for the proposed project.

4.6 Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources results in the permanent loss of: 1) nonrenewable resources, such as minerals or cultural resources; 2) resources that are renewable only over long periods of time, such as soil productivity; or 3) a species (extinction) (USDA 1995, Vol. II, p. 4-93). Except for Alternative 1, there is an irreversible commitment of labor, fossil fuel, and money spent on the project.

An irretrievable commitment is one in which a resource product or use is lost for a period of time while managing for another (USDA 1995, Vol. II, p. 4-93). For this project, no irretrievable commitments were identified.

4.7 Cumulative Effects

No cumulative effects were identified for this proposed project. Cumulative effects are the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions, that collectively are significant.

Five sites proposed for treatment in 2003 had treatments in previous years, but the cumulative effects of these treatments are not significant. The Pierceton site was treated in 2001 with mating disruption, and in 2002, it was mass trapped plus a ground treatment of Btk on cemetery trees. The Shively Road site was mass trapped in 2002. The northern part of the Dunes SP site was treated with mating disruption in 1999 and a 40-acre site in the northern part of the Dunes SP site was treated with Btk in 1996. The northwest corner of the Furnessville mating disruption site was treated with mating disruption in 1999. A 45-acre site in the northern part of the South Bend mating disruption site was treated with Btk in 1996. The other sites have not had previous gypsy moth treatments.

Two sites, Furnessville and South Bend, are proposed to receive Btk treatments in core areas and mating disruption over the entire treatment sites. No cumulative effects are known or expected from these multiple treatments. No gypsy moth treatments by the private sector are expected in the state during the current year.

4.8 Other Information

Mitigation

The Cooperative Gypsy Moth Project will implement the following safeguards and mitigating measures:

- News releases of treatments and dates will be given to local newspapers and radio/TV stations.
- Local safety authority will be notified by direct contact or phone calls.
- Employees of state and federal agencies monitoring the treatment will receive training on treatment methods to be able to answer questions from the public.
- Notification will contain information pertinent to the specific treatment, treatment boundaries, treatment schedule, and precautions to be taken.
- Application of Btk will be suspended when school children are present outside.
- Aircraft will be calibrated for accurate application of treatment material.
- Applications will be timed so the most susceptible gypsy moth stage is targeted.
- Weather will be monitored during treatment to assure accurate deposition of the treatment material.

Monitoring

During the treatments, ground observers and/or aerial observers will monitor the application for accuracy within the block perimeters, swath width, and drift. Application information (e.g. swath widths, spray-on and spray-off, acres treated, and altitude) will be downloaded to an operations-base computer.

The Btk and mating disruption treatment sites will be monitored using gypsy moth traps to determine the effectiveness of the treatments.

5.0 LIST OF PREPARERS

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EA Responsibility: Participated in writing and reviewing the environmental assessment and in the development of the proposed cooperative gypsy moth project.

Experience and Education: Experience as Forest Health Specialist since 1974 and experience in gypsy moth management since 1977. M.F., Duke University in Forest Entomology and Pathology; B.A., Catawba College in pre-forestry.

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Experience and Education: Supervisory Entomologist and experience in gypsy moth management since 1983, B.S., Purdue University in entomology.

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Donna Leonard, Entomologist, STS Coordinator, USDA Forest Service, FHP, P.O. Box 2680, Asheville, NC 28802. Consultation on treatment sites and development of cooperative project.

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Mike Neyer, Director, Division of Water, 402 West Washington Street, Room 273W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

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Jon Smith, IDNR Historical Preservation and Archaeology, 402 West Washington Street, Room W274, Indianapolis, IN 46204. Historical property of concern.

Zack Smith, Forest Entomologist, IDNR Forestry, 402 West Washington Street, Room 296W, Indianapolis, IN 46204. Consultation on treatment sites and development of cooperative project.

Robert Waltz, State Entomologist, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204. Process and structure of the Environmental Assessment.

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